

**RECEIVED  
CENTRAL FAX CENTER**

**APR 08 2008**

IN THE CLAIMS:

1 (currently amended): A surface acoustic wave device comprising a piezoelectric substrate and an IDT that is formed on said piezoelectric substrate and is made from Al or alloy including Al as a main component, an excited wave being an SH wave, wherein

said piezoelectric substrate is a rotation Y cut substrate made from a quartz flat [[plate]] substrate,

where a cut angle  $\theta$  of ~~a rotation Y cut quartz substrate~~ said piezoelectric substrate is a rotation angle of a crystal Z-axis when the piezoelectric substrate is rotated around a crystal X-axis,

a direction in which the piezoelectric substrate is rotated from a positive Z-axis side to a positive Y-axis side is a direction in which said cut angle  $\theta$  is minus, and

the cut angle  $\theta$  is set in a range of  $-64.0^\circ < \theta < -49.3^\circ$  ~~in a counterclockwise direction from a crystal Z-axis,~~ and a propagation direction of a SAW is set to  $(90^\circ \pm 5^\circ)$  to a crystal X-axis, and

when a wavelength of the SAW to be excited is represented as  $\lambda$ , an electrode film thickness  $H/\lambda$  standardized by a wavelength of said IDT is set to satisfy  $0.04 < H/\lambda < 0.12$ .

2 (original): The surface acoustic wave device according to claim 1, wherein a relationship between the cut angle  $\theta$  and the electrode film thickness  $H/\lambda$  satisfies -  $1.34082 \times 10^{-4} \times \theta^3 - 2.34969 \times 10^{-2} \times \theta^2 - 1.37506 \times \theta - 26.7895 < H/\lambda < -1.02586 \times 10^{-4} \times \theta^3 - 1.73238 \times 10^{-2} \times \theta^2 - 0.977607 \times \theta - 18.3420$ .

3 (original): The surface acoustic wave device according to claim 1, wherein, when an electrode finger width of electrode fingers constituting said IDT/(electrode finger width + space between electrode fingers) is defined as a line metalization ratio  $mr$ , a

relationship between the cut angle  $\theta$  and a product  $H/\lambda \times mr$  of the electrode film thickness and the line metalization ratio satisfies  $-8.04489 \times 10^{-5} \times \theta^3 - 1.40981 \times 10^{-2} \times \theta^2 - 0.825038 \times \theta - 16.0737 < H/\lambda \times mr < -6.15517 \times 10^{-5} \times \theta^3 - 1.03943 \times 10^{-2} \times \theta^2 - 0.586564 \times \theta - 11.0052$ .

4 (currently amended): A surface acoustic wave device comprising a piezoelectric substrate and an IDT that is formed on said piezoelectric substrate and is made from Al or alloy including Al as a main component, an excited wave being utilized as an SH wave, wherein

said piezoelectric substrate is a rotation Y cut substrate made from a quartz flat [[plate ]] substrate,

where a cut angle  $\theta$  of ~~a rotation Y cut quartz substrate~~ said piezoelectric substrate is a rotation angle of a crystal Z-axis when the piezoelectric substrate is rotated around a crystal X-axis,

a direction in which the piezoelectric substrate is rotated from a positive Z-axis side to a positive Y-axis side is a direction in which said cut angle  $\theta$  is minus, and

the cut angle  $\theta$  is set to satisfy in a range of  $-61.4^\circ < \theta < -51.1^\circ$  in a  
~~counterclockwise direction from a crystal Z-axis,~~ and a propagation direction of a SAW is set to  $(90^\circ \pm 5^\circ)$  to a crystal X-axis, and

when a wavelength of the SAW to be excited is represented as  $\lambda$ , an electrode film thickness  $H/\lambda$  standardized by a wavelength of the IDT is set to satisfy  $0.05 < H/\lambda < 0.10$ .

5 (original): The surface acoustic wave device according to claim 4, wherein a relationship between the cut angle  $\theta$  and the electrode film thickness  $H/\lambda$  satisfies  $-1.44605 \times 10^{-4} \times \theta^3 - 2.50690 \times 10^{-2} \times \theta^2 - 1.45086 \times \theta - 27.9464 < H/\lambda < -9.87591 \times 10^{-5} \times \theta^3 - 1.70304 \times 10^{-2} \times \theta^2 - 0.981173 \times \theta - 18.7946$ .

6 (original): The surface acoustic wave device according to claim 4, wherein  
when an electrode finger width of electrode fingers constituting said  
IDT/(electrode finger width + space between electrode fingers) is defined as a line  
metalization ratio  $m_r$ , a relationship between the cut angle  $\theta$  and a product  $H/\lambda \times m_r$   
of the electrode film thickness and the line metalization ratio satisfies  $-8.67632 \times$   
 $10^{-5} \times \theta^3 - 1.50414 \times 10^{-2} \times \theta^2 - 0.870514 \times \theta - 16.7678 < H/\lambda \times m_r < -5.92554 \times 10^{-5} \times \theta^3 -$   
 $1.02183 \times 10^{-2} \times \theta^2 - 0.588704 \times \theta - 11.2768$ .

7 (original): The surface acoustic wave device according to any one of claims 1 to 6,  
wherein

said surface acoustic wave device is a one-port surface acoustic wave  
resonator where at least one IDT is disposed on said piezoelectric substrate.

8 (original): The surface acoustic wave device according to any one of claims 1 to 6,  
wherein

said surface acoustic wave device is a two-port surface acoustic wave  
resonator where at least two IDTs are disposed along a propagation direction of a  
surface acoustic wave on said piezoelectric substrate.

9 (original): The surface acoustic wave device according to any one of claims 1 to 6,  
wherein

said surface acoustic wave device is a lateral coupling type multi-mode filter  
where a plurality of surface acoustic wave resonators are disposed in proximity to  
each other in parallel with a propagation direction of a surface acoustic wave on said  
piezoelectric substrate.

10 (original): The surface acoustic wave device according to any one of claims 1 to  
6, wherein

said surface acoustic wave device is a vertical coupling type multi-mode filter where two-port surface acoustic wave resonators comprising a plurality of IDTs are disposed along a propagation direction of a surface acoustic wave on said piezoelectric substrate.

11 (original): The surface acoustic wave device according to any one of claims 1 to 6, wherein

said surface acoustic wave device is a ladder type surface acoustic wave filter where a plurality of surface acoustic wave resonators are connected on said piezoelectric substrate in a ladder shape.

12 (original): The surface acoustic wave device according to any one of claims 1 to 6, wherein

said surface acoustic wave device is a transversal SAW filter where a plurality of IDTs propagating a surface acoustic wave bidirectionally are disposed on said piezoelectric substrate at predetermined intervals.

13 (original): The surface acoustic wave device according to any one of claims 1 to 6, wherein

said surface acoustic wave device is a transversal SAW filter where at least one IDT propagating a surface acoustic wave in one direction is disposed on said piezoelectric substrate.

14 (original): The surface acoustic wave device according to any one of claims 1 to 6, wherein

said surface acoustic wave device is a surface acoustic wave sensor.

15 (previously presented): The surface acoustic wave device according to any one of claims 1 to 6, wherein

said surface acoustic wave device has grating reflectors on both sides of an IDT.

16 (previously presented): A module device or an oscillation circuit using the surface acoustic wave device according to any one of claims 1 to 6.